UNIVERSITY OF PUNE

[4364]-122

B. E. (Electronics)

Electronic Product Design

(2003 Pattern)

Total No. of Questions : 12 **[Total No. of Printed Pages :3]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answer any 3 question from each section.

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Neat diagram must be drawn wherever necessary.

(4) Black figures to the right indicate full marks.

(5) Use of electronic pocket calculator is allowed.

(6) Assume suitable data, if necessary.

Section-I

Q1.

a) Explain the different stages of an electronic product development indicating the importance of each stage. [6]

b) Explain the bathtub curve for reliability indicating all regions. [6]

c) What is need of grounding? Explain the different types of grounding. [6]

OR

Q2.

a) Discuss the ergonomic & aesthetic design considerations with suitable example. [6]

b) What are the different noise coupling mechanisms? [6]

c) Discuss the main objectives of packing for an electronic product. [6]

Q3.

a) What are the different PCB design considerations for microprocessor / microcontroller based circuits. [8]

b) Explain different termination schemes for avoiding reflection in high speed PCB designs. [8]

OR

Q4.

a) Explain the PCB design considerations with respect to-
   1) Analog a digital grounds
   2) Grounds bounce. [8]

b) Calculate the resistance of 1 cm long copper track with width of 1 mm for a standard 35 micron copper clad laminates at 25°c. Estimate the change in resistance if the temperature of track increases to 50°c. Comment on result. (assume $\rho=1.72\times10^{-6}\Omega$.cm) [8]

Q5.

a) Define signal integrity. Explain the importance of signal integrity. Also state the parameters on which signal integrity depends. [8]

b) Explain the use & limitations of AC & DC analysis with the help of suitable example. [8]

OR

Q6.

a) Discuss the capabilities of DPO & logic analyser. [8]

b) Explain with justification & schematic arrangement, the type of instrument you will suggest to identify the fault-
   1) A combinational logic circuit producing glitches.
   2) Two stages RC coupled amplifier. [8]

Section-II

Q7.

a) With the help of block diagram explain the different stages of software design. [6]

b) State the features of flowchart & pseudocode. [6]

c) What are the considerations in selecting assembly language and/or high level language. [6]

OR

Q8.

a) Explain the factors that determine selection of software for robotic arm system. [6]

b) Explain the different software bugs & how to eliminate them. [6]

c) Discuss the use of in-circuit simulator & cross-compiler. [6]

Q9.

a) Explain different temperature tests carried out on an industrial product in detail. [8]

b) Define CE marking, and explain the importance & procedure of CE marking. [8]

OR

Q10.

a) Explain the importance of vibration test. Explain the precautions to be taken to minimise the effects of vibration. [8]

b) What are the different sources of ESD & discuss how to minimize ESD [8]

Q11.

a) Define documentation & explain the importance of documentation in product design & development. [8]

b) Justify-

1) BOM is considered to be the basic product document
2) Bare board testing is essential for PCB's with high track density. [8]

OR

Q12.

a) Explain the contents of service manual, instruction manual & user manual. [8]

b) Justify –

1) Engineering notebook is foundation of any engineering task
2) Paper phenolic laminates are not suitable for industrial products [8]

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[Total No. of Questions: *10***]** **[Total No. of Printed Pages:** *2***]**

UNIVERSITY OF PUNE
[4364]-127
B. E. (Electronics Engg) Examination - 2013
Advanced Digital Signal Processing (2003 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1. *Answer any three questions from each section.*
2. *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*
3. *Neat diagrams must be drawn wherever necessary.*
4. *Figures to the right indicate full marks.*
5. *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
6. *Assume suitable data, if necessary.*

SECTION -I

Q.1	A	Explain the term Interpolation. Explain the sampling rate conversion by a factor of 3/2.	8
	B	Why antialising filter is required in a decimator? Draw a spectrum at each stage of decimator.	8
		OR	
Q.2	A	For the system: $H(z)= 1/(1-9z^{-1})$ Determine $P_0(Z)$ and $P_1(z)$ for the two component decomposition.	8
	B	What is need for anti imaging filter after up sampling a signal?	8
Q. 3	A	Explain any one application of multi rate DSP	8
	B	Explain the method to solve a problem using least square techniques?	8
		OR	
Q. 4	A	Explain weiner filter design.	8
	B	Explain prony's method for determining poles and zeros of a transfer function.	8
Q. 5	A	Draw a second order filters using lattice structure and derive expression for the output of each stage.	10
	B	Explain the design of optimal equiripple linear phase FIR filter.	8

SECTION II

Q. 6	A	Compare microprocessor and Digital Signal Processor	8
	B	Write Salient feature of TMS320 C 54 XX	4
	C	Explain in short with applications and need of adaptive filter	4

OR

Q. 7	A	Explain how adaptive beam former can be used in RADAR and SONAR applications	8
	B	Explain the architectural differences between TMS and ADSP processors	8
Q. 8	A	Explain alternation theorem. What is the application of this theorem?	8
	B	Explain gradient adaptive lattice filter design	8

OR

Q. 9	A	Explain Widrow LMS algorithm	8
	B	Write short note on 1) Prediction 2) Deconvolution in least square method	8
Q. 10	A	Draw a super Harvard Architecture and explain how it is useful for execution of MAC instruction?	10
	B	Write an algorithm for implementation of the decimator. Modify it for implementation of sampling rate convertor by a factor of 5/2.	8

UNIVERSITY OF PUNE

[4364]-131

B. E. (Electronics Engineering) Examination - 2013

Management Information System

(2003 Course)

[Total No. of Questions: 12] **[Total No. of Printed Pages :3]**

[Time: *3* Hours] **[Max. Marks: 100]**

Instructions:

(1) Answer any three questions from each section.

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Neat diagram must be drawn wherever necessary.

(4) Figures to the right indicate full marks.

(5) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

(6) Assume suitable data, if necessary.

SECTION-I

Q1	A	What do you understand by the term "Convergence technology"? What are its implications for the technology industry?	8
	B	Describe various information purposes. Elaborate how decision-making can be viewed to be the dominant purpose of using information.	8
		OR	
Q2	A	What is the change implication of IT development for procedures for internal accounting control and their complements in auditing?	8
	B	Explain key concept of MIS	8
Q3	A	Why does a technological shift from energy based to data driven technologies create a new market need to use information decision 'smarter'?	10
	B	Define- information integrity, information integrity risk.	6
		OR	
Q4	A	Why is a business process in a complex and changing environment an open system?	8
	B	Explain why there is a shift from collective design decision to individual design decision with example.	8
Q5	A		

(I) "The focus of a System Dynamics study is not a system, whatever it is, but a problem."
What is the significance of "System Dynamics" methodology in studying the complex system failures? Explain with the help of an example.

(II) Discuss- Dynamo 9

B List and briefly describe stages in approaching a problem in system using the System Dynamics methodology. 9

OR

Q6 A "In engineering design and control, there is a subject area of "systems engineering", which is concerned with planning and design of (large) system to achieve proper balance, performance, and economy. For example, design and development and launching into the space of a communication satellite is a systems engineering project." 8
What is the difference in studying a system from the "system engineering" angle and from "System Dynamics" angle? Explain with the help of an example of your choice.

B Describe the following System Dynamics variables

i. Level variable

ii. Rate variable

iii Parameter and input variable

iv Supplementary variable

V Auxiliary variable 10

SECTION-II

Q7 A "System dynamics modeling uses casual-loop diagrams. The diagrams are referred as influence diagram, or, more mathematically, as directed graphs. This is because the individual links (giving variable influence or graph direction) in such diagrams are labeled to show whether the nature of the cause-link is "positive"(+) or "negative" (-)" 8

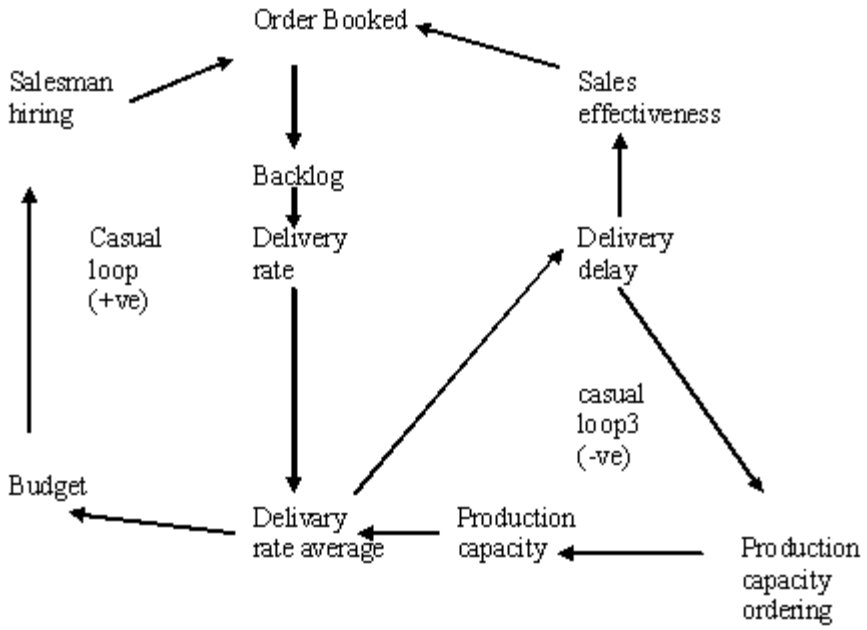

Figure (1): System Dynamics Modeling of a Business giving Casual Loop Structure for Sales Growth, delivery Delay and Capacity Expansion

Analyze the business model in Figure (1) and show the nature of each link if the business is experiencing stagnation in sales growth even in the presence of an unlimited market.

B Develop a systems view of Integrity Information Technology Development system. In process explain the significance of system Dynamics modeling for Integrity Information System Development. 10

OR

Q8 A Consider the following "job backlog-anxiety system".

"in a situation of high backlog of work, a larger number of task are to be completed, which causes anxiety to rise. Rise in anxiety makes it more difficult to concentrate and complete any given task. This increase the average time to complete a task. This results in slowing down of task completion rate, which in turn has the job backlog depleted less rapidly."

i. Present above system by its casual-loop representation? Is it feedback loop? If yes, which type, negative or positive? 9

ii. Identify feedback loops in the project structure and explain their nature. Do these feedback loops control the system problems? Explain. 9

Q9	A	What do you understand by the term Total Quality Management?	8
	B	"I*I in computerized information system, which has a context specific application, is an interdisciplinary area". Explain briefly.	8
		OR	
Q10	A	What is the theory of uncertainty avoidance, i.e., risk aversion? What does it state? What is its implication for decision making?	8
	B	Explain why"Usability Risk" by itself is irrelevant with respect to determining which decision action to choose.	8
Q11	A	Define components of I*I risk.	8
	B	Why are existing perceptions of certainty, risk, uncertainty, and risk the concern of information economics?	8
		OR	
Q12	A	Write short notes on – Acquisition cycle, Utilization cycle, information integrity cycle under the I*I technology development.	8
	B	Give Cost benefit Analysis equation Integrity and each term of the equation.	8

[Total No. of Questions: *12*] **[Total No. of Printed Pages: 3]**

UNIVERSITY OF PUNE
[4364]-134
B. E. (Electronics Engineering),Examination - 2013
Artificial Intelligence (2003 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1 *Answer 3 questions from Section I and 3 questions from Section II*

2 *Answers to the two sections should be written in separate answer-books.*

3 *Neat diagrams must be drawn wherever necessary.*

4 *Black figures to the right indicate full marks.*

SECTION -I

Q.1	A	What are intelligent agents? Explain the architecture of typical agent.	10
	B	Compare Depth first search & Breadth first search.	08
		OR	
Q.2	A	Define Artificial intelligence. List the applications of Artificial intelligence.	10
	B	Define in your own words the following terms: state, state space, search tree, search node, goal, action, successor function, and branching factor.	08
Q. 3	A	Prove each of the following statements i) Breadth-first search is a special case of a uniform cost search. ii) Breadth-first search, Depth-first search, and uniform cost search are special cases of best-first search. iii) Uniform cost search is a special case of A* search	08
	B	Explain Hill climbing algorithm in details.	08
		OR	
Q. 4	A	Prove that is a heuristic is consistent, it must be admissible. Construct an admissible heuristic that is not consistent.	08
	B	Explain Genetic algorithm in details.	08
Q. 5	A	Explain how frames can be used for knowledge representation. Give an example.	08
	B	Explain with suitable example how scripts can be used to represent knowledge.	08

OR

Q. 6	A	Construct a representation for the exchange rate between currencies that allows fluctuations on a daily basis.	08
	B	Represent the sentence "All Germans speak the same languages" in predicate calculus. *Use Speaks(x,l)*, meaning that person *x* speaks language *l.*	08

SECTION-II

Q. 7	A	What are the different learning methods? Explain them in short.	10
	B	Which are the different ways to assess the performance of learning algorithm?	08

OR

Q. 8	A	Explain the decision tree algorithm with suitable example.	10
	B	Explain in detail architecture of artificial neural network.	08
Q. 9	A	What is different between expert system and traditional system? Comment on advantage and disadvantages of expert system.	08
	B	Design phases of an expert system to diagnose childhood disease.	08

OR

Q. 10	A	Explain Waltz Algorithm with example and comment on its limitations.	08
	B	What is perception? Give detailed structure of it.	08
Q. 11	A	What is NLP? Explain all the five phases of NLP.	08
	B	Parse each of the sentences using top-down and bottom-up approach. I. Mary watered the plants. II. The brown dog ate the bone	08

OR

Q. 12	A	Explain the syntactic analysis with suitable Example.	08
	B	Explain the semantic analysis with suitable example.	08

[Total No. of Questions: 12] **[Total No. of Printed Pages:** 2]

UNIVERSITY OF PUNE

[4364]-135

B.E. (Electronics) Examination-2013

ROBOTICS & INDUSTRIAL AUTOMATION

(2003 Course)

[Time: 3 **Hours]** **[Max. Marks: 100]**

Instructions:

1) *Attempt: Q.No.1 or Q.No.2, Q.No.3 or Q.No.4, Q.No.5 or Q.No.6 in Section-I and Q.No.7 or Q.No.8, Q.No.9 or Q.No.10, Q.No.11 or Q.No.12 in Section-II.*
2) *Answers to the two sections should be written in separate answer-books.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*
5) *Use of electronic pocket calculator is allowed.*
6) *Assume suitable data, if necessary.*

SECTION-I

Q1 **(a)** Draw neat sketch of basic robotic system. Explain the function of each block. **[10]**

(b) Discuss typical specifications of a pick and place robot. **[8]**

OR

Q2 **(a)** Explain the following terms: **[10]**
1) Tip speed 2) Spatial Resolution 3) Degrees of freedom
4) Pay load 5) Repeatability

(b) Explain the terms-Pitch, roll and Yaw with the help of neat sketch. **[8]**

Q 3 **(a)** Explain the Graphical approach for obtaining Inverse Solution. **[8]**

(b) What is the significance of D-H representation? Discuss D-H algorithm. **[8]**

OR

Q4 **(a)** Explain term–Robot arm dynamics. Discuss the E-L formulation used for a robotic manipulator. **[8]**

(b) What is Articulated robot? Explain the application in which it is most suitable. **[8]**

Q 5 **(a)** Explain the Lift & Tray technique for slip detection with the help of neat diagram. **[8]**

(b) Explain the role of actuator in a robot. Explain any one with neat sketch. **[8]**

OR

Q 6	**(a)**	What is the function of end effector in a robot? What factors are taken in account in designing of a gripper?	**[8]**
	(b)	Explain the concept of servocontrolled and non-servo controlled robots.	**[8]**

SECTION-II

Q 7	**(a)**	A joint of 6 axis robot goes from initial angle of 45° to final angle of 90° in 5 seconds. Using a third degree polynomial, calculate the joint angles at intervals of 1 second. Also calculate joint velocities & acceleration. Plot the joint angles, velocities and accelerations from 0 to 6 second.	**[10]**
	(b)	Derive expression for Jacobian matrix for prismatic and revolute joint.	**[8]**

OR

Q 8	**(a)**	R-R-R manipulator is at initial position (30, 60, -30) degrees. It is required to move to (90, 0, 0) degrees. Assume that the joints have maximum absolute acceleration/decceleration of (30, 60, 90) degrees/sec^2 & maximum velocities of (30, 60, 90) degrees/sec. calculate the travel time for each joint using slew motion.	**[10]**
	(b)	Explain the terms Path Planning and Trajectory Planning.	**[8]**
Q 9	**(a)**	How vision sensors can be categorized according to their dimensionality? Discuss any one type with neat diagram.	**[8]**
	(b)	Discuss the term Perspective Transformation in Robot Vision System.	**[8]**

OR

Q 10	**(a)**	What are different types of vision sensors used in robotics? Explain any one of them with the help of neat sketch.	**[8]**
	(b)	Name various segmentation techniques used in robot vision system. Explain any one of them.	**[8]**
Q 11	**(a)**	Explain the terms-MEMS and Microsystems.	**[8]**
	(b)	What do you mean by Nanorobot? Name its various fields of application. Explain any one application, in detail.	**[8]**

OR

Q 12		Write notes on- **a)** H matrix **b)** Link and Joint Parameters **c)** Teach Pendent **d)** Screw Transformation	**[16]**

[Total No. of Questions:12] **[Total No. of Printed Pages:3]**

UNIVERSITY OF PUNE

[4363]-126

T. E. (*Mechanical-S/w*) Examination - 2013

(Mechatronics)(2008 Course)

[Time: *3* Hours] **[Max. Marks: 100]**

Instructions:

1 Answers ***any three*** *questions from each section.*

2 Assume suitable data, if necessary.

SECTION -I

Q.1 A Explain the signal conditioning elements used in mechatronics system and state its functions 5

B Derive the expression of gauge factor in strain gauge 5

C The platinum resistance temperature detector has a temperature coefficient of resistance as 0.004 **Ω**/**Ω**/° C. The resistance at 40° C is 130**Ω**. Find the resistance at 300°C. 6

OR

Q.2 A Distinguish between the following: 8

i) Threshold and resolution

ii) Precision and Accuracy

B An electrical resistance of a strain gauge of 120**Ω** and gauge factor of 2 is bonded to steel having an elastic limit stress of 400 MN/m^2 and modulus of elasticity of 200 GN/m^2. Calculate the change of resistance, 8

i) due to change of stress equal to $\frac{1}{10}$ of the elastic range.

ii) due to an increase of temperature of 20° C if the gauge material is advance alloy.

Given:

a) temperature coefficient of expansion of steel=12×10^{-6}/°C

b) temperature coefficient of expansion of advance alloy=10×10^{-6}/°C

c) temperature coefficient of resistance of advance alloy=20×10^{-6}/°C

Q. 3 A Explain the principle of operation of absolute optical encoder. 5

	B	Explain how displacement is sensed by LVDT with neat sketch show how it can be made phase sensitive.	6
	C	State the advantages and limitations of potentiometric transducer.	5
		OR	
Q. 4	A	Determine the resolution of: i) optical incremental encoder having 60 number of slots on the disc. ii) optical absolute encoder having 10 tracks.	6
	B	Explain the capacitive transducer for measurement of displacement.	5
	C	State the typical specifications of LVDT. Also state its advantages and limitations.	5
Q. 5	A	Explain Analogue to digital converter.	6
	B	Derive a first order differential equation of the temperature indicated by the thermometer T will vary with time when the thermometer is inserted in a hot liquid having a temperature T_L.	6
	C	Write a short note on transfer function	6
		OR	
Q. 6	A	Explain the building blocks of electrical system	6
	B	Explain Digital to Analogue converter	6
	C	Write a short note on SCADA	6
		SECTION II	
Q. 7	A	Differentiate between open loop control system and closed loop control system	5
	B	Define the following terms: i) Process equation ii) Process load	5
	C	A controller outputs a 4 to 20mA signal to control motor speed from 140 to 600 rpm linearly, calculate i) Current corresponding to 310rpm ii) The value of current expressed as the percentage of control output.	6
		OR	
Q. 8	A	Explain Feed forward control system with suitable example	5
	B	Explain the following terms: i) Control lag ii) Dead time	5
	C	A controlling variable is a motor speed that varies from 800 to 1750 r.p.m. If the speed is controlled by a 25 to	6

50V DC signal, calculate:

a. the speed produced by an input of 38 V and
b. the speed calculated as a percent of span.

Q. 9	A	Explain two step mode of controller with suitable example	5
	B	Derive the expression for transfer function for proportional plus derivative control system	5
	C	An integral controller is used for speed control with a set point of 12rpm within a range of 10 to 15 rpm. The controller output is 22% initially. The constant K_I= -0.15% controller output per second per percentage error. If the speed jumps to 13.5 rpm, calculate the controller output after 2s for a constant e_p	6

OR

Q. 10	A	Explain P+I+D control action with suitable example.	8
	B	A liquid level control system linearly converts a displacement of 2 to 3 m into a 4 to 20 mA control signal. A relay serves as the two position controller to open or close an inlet valve. The relay closes at 12mA and opens at 10mA. Find a) the relation between the displacement level and current. b) the neutral zone or displacement gap in meters.	8
Q. 11	A	Explain various criteria to be considered for selecting the PLC	4
	B	Write a short note on: i) Timers ii) Counters	6
	C	Explain bottle filling plant with a neat sketch and draw its ladder diagram.	8

OR

Q. 12	A	Compare PLC with relay control.	4
	B	State the typical specifications of PLC.	6
	C.	Explain elevator application with a neat sketch and draw its ladder diagram.	8

UNIVERSITY OF PUNE

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B. E. (Electronics) Examination-2013

Computer Network

(2008 Pattern)

Total No. of Questions : 12 **Total No. of Printed Pages :[3]**

[Time : 3 Hours] **[Max. Marks : 100]**

Section –I

Q.1 a) State and explain the necessity of Computer Network? Give the different ways Computer Network can be established stating their advantages. (10)

b) What are the design issues of Data Link Layer of OI- reference model? Give the significance for upper and lower layers. (08)

OR

Q.2 a) Compare TDM, FDM, WDM. (10)

b) Explain switching techniques giving advantages. (08)

Q.3 a) State the headers added by various layers in data communication by OSI model. (08)

b) Explain IEEE 802.3 Frame format. (08)

OR

Q.4 a) State and explain Static & Dynamic channel allocation issues. (08)

b) Give 2- Protocol for collision avoidance & justify how they avoid the collision. (08)

Q.5 a) Explain the functions of Network layers. (08)

b) Explain Static & Dynamic routing giving example. (08)

OR

Q.6 a) Explain Bellman –Ford algorithm for routing. (08)

b) Define and explain ‘count to infinity’ entry in routing table.

Section –II

Q.7 a) Explain Connection oriented and connectionless services offer by transport layer (10)

b) State and explain the limitations of UDP. (08)

OR

Q.8 a) Compare the virtual circuit and datagram Services. (08)

b) State and explain utility of AAL-3/4. (10)

Q.9 a) what do you mean by Active & Passive Hackers how they can be prohibited. (08)

b) Explain traditional cryptography & State their limitation. (08)

OR

Q. 10 a) State and explain select key algorithm, discuss the advantages. (08)

b) State & explain an algorithm for online cryptography of 64- bits. (08)

Q.11. Write note on a) Digital Signature (08)

b) Domain Name Service (08)

OR

Q.12. Write note on a) www (08)

b) Email Services. (08)

UNIVERSITY OF PUNE
[4364]-123
B. E. (ELECTRONICS) Examination 2013
ADVANCED POWER ELECTRONICS
(2003 Pattern)

[Total No. of Questions:12] **[Total No. of Printed pages :3]**
[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answers to the two Sections should be written in separate answer-books
(2) Neat diagrams must be drawn wherever necessary.
(3) Black figures to right indicate full marks.
(4) Use of logarithmic tables and non programmable electronic pocket calculator is allowed.
(5) Assume suitable data, if necessary.

SECTION –I

Q.1 a) Draw neat circuit diagram of 3-ϕfull converter. [8]
Write the triggering sequence for the SCRs. Explain the operating modes of this circuit for highly inductive load.

b) Draw simplified block diagram of ideal dual converter. Derive the relation between the firing angles of both the converters so as to get the same DC voltage at the output of both the converters. [6]

c) Explain briefly: series operation of SCRs. [4]

OR

Q.2 a) For a 3- phase full converter supplying power to highly inductive load, find: [8]
i)Average output voltage
ii) Supply power factor
iii)Distortion factor of the supply current.
iv)Displacement power factor.
The input supply is 3ϕ, 415v, 50Hz and the firing angle of SCRs adjusted to 30^0 .

b) Explain the effect of source inductance on the performance of single phase converter. [6]

c) Why is it necessary to connect power devices in parallel ? [4]
Explain the necessary circuits you will use to ensure for proper paralleling of SCRs.

Q3. a) With the help of a neat circuit diagram and relavent waveforms, [10]
explain the operation of 3 ϕ VSI for 180^0 conduction of switches.
compare the operation with 120^0 conduction mode.
b) Write a short note on ASCSI. [6]

OR

Q4. a) Explain the necessity of voltage control and harmonic reduction [12]
in inverters. Enlist various methods of harmonic reduction in VAI.
Explain any one method of harmonic reduction in details.
b) Explain the operation of Boost inverter briefly. [4]

Q5. a) What is input power factor of converter? [10]
Explain the symmetrical angle control (SAC) method of power factor improvement in LCC.
b) Mention various techniques used for sensing speed of a DC motor and [6]
explain one in details.

OR

Q6. Compare linear, switch- mode and resonant power supplies. [16]
Explain the operation of zero current switching (ZCS) resonant DC-DC converter.

SECTION II

Q7. a)With the help of a neat circuit diagram and wave forms explain [10]
the operation of single phase semiconverter driven separately excited DC motor drive. Assume the load current to be continuous.
b) Explain the construction and principle of operation of permanent [8]
magnet stepper motor.

OR

Q8 a) Semiconverter operate from 1ϕ, 230v, 50Hz supply drives [10]
a 10Hp , 200v , 1500 rpm separately excited motor. The rated armature

current is 40A. The motor parameters are: Ra = 0.5**Ω**, la =10mH , kaϕ=0.2 V/rpm. Find out the following for $\alpha=30^0$

i)Average armature voltage ii)Back emf

iii)Speed iv)Motor torque

v)Supply power factor.

b) Explain how microstepping is achieved in stepper motor drives? [8]

Q9. a)Explain Scherbius drive for slip power recovery of induction motor. [8]

b) Explain various braking techniques used for DC motors. [8]

OR

Q10.a) Explain V/f control drive for induction motor. [8]

b) What are brushless DC motors? Explain any one method of speed control of brushless DC motor. [8]

Q11. a) Explain various types of disturbances in power line. [8]

b) Write note on: Energy audit. [8]

OR

Q12. a) What are the various sources which cause disturbance in a power line? Explain . [10]

b) Explain the techniques of measurement of power line disturbances. [6]

UNIVERSITY OF PUNE

[4364]-124

B. E. (Electronics) April - May Examination –2013

VLSI Design (404204)(Course 2003)

[Total No. of Questions:12] **[Total No. Printed Pages:2]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*1) Answer **any three** questions from each I and three questions from section II*

2) *Answers to the **two sections** should be written in **separate answer-books**.*

3) *Neat diagrams must be drawn wherever necessary.*

4) *Black figures to the right indicate full marks.*

5) *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

6) Assume suitable data, if necessary.

SECTION –I

Q 1a) Write VHDL code for bidirectional 4 bit synchronous counter with mode control. [8]

b) Explain the process of "Synthesis" and list the Synthesizable and Non synthesizable statements. [8]

OR

Q 2a) Differentiate between: [8]

i) Function Vs Procedure.

ii) Signal Vs variable.

b) Write VHDL code for 4 bit shift register. [8]

Q 3a) Draw state diagram and write VDHL code for traffic light controller Controlling traffic for two lane intersection. [10]

b) Compare various FSM state encoding techniques. Which is the most suitable for FPGA's? Why? [8]

OR

Q 4a) Draw state diagram and write VHDL code for lift controller. [10]

b) What is metastability? State the solutions. Explain any one solution in detail. [8]

Q 5a) Draw block diagram and explain the architecture of CPLD [8]

b) Write four specifications of CPLD and FPGA each. [8]

OR

Q 6a) Differentiate PLD, CPLD and FPGA. [8]

b) Draw only the block diagram of FPGA. Explain selection criterion of FPGA. [8]

SECTION – II

Q 7a) Explain the concept of EMI immune design. [10]

b) Explain off chip connection and I/O architecture. [8]

OR

Q 8a) Explain SRC and DRC. [10]

b) Write short note on SDRAM and FIFO. [8]

Q 9a) Explain in detail VI characteristics of CMOS inverter. [8]

b) Explain power dissipation and power delay product [8]

OR

Q 10a) What is technology scaling? Explain any two methods of technology scaling. [8]

b) Draw CMOS NAND2 and NOR2 gates. [8]

Q 11a) Explain stuck at fault methods. [8]

b) What is BIST? Why is it needed? Design BIST for 4 bit synchronous counter. [8]

OR

Q 12a) What is need of design for testability? Explain in brief with suitable Example. [8]

b) What is need of boundary scan? Give suitable examples. [8]

[Total No. of Questions: *12*] **[Total No. of Printed Pages: *3*]**

UNIVERSITY OF PUNE

[4364]-125

B. E. (*Electronics Engineering*) Examination - 2013

Embedded system Design (2003 Course)

[Time: *3* Hours] **[Max. Marks: 100]**

Instructions:

1 ***Answer any 3 questions from Section.***

2 *Answers to the **two sections** should be written in **separate answer-books**.*

3 *Black figures to the right indicate full marks.*

4 *Neat diagrams must be drawn wherever necessary.*

5 *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

6 *Assume suitable data, if necessary.*

SECTION –I

Q.1	A	Define embedded system and discuss main features of such systems. Illustrate your discussion with examples of embedded systems.	08
	B	What is the selection criteria of controllers used in embedded system design and communication interfaces?	10

OR

Q.2	A	Describe the application areas of embedded system design. Give examples for each application.	08
	B	List and explain the Design Metrics that may compete with one another providing an explanation for competition and give significance of market window and delayed market entry.	10
Q. 3	A	What is hardware architecture of Embedded System Design and explain one embedded processor.	08

	B	Explain the process of generating an executable image for embedded software.	08
		OR	
Q. 4	A	Explain Hardware/Software co-design methodology. Give features of Embedded Operating System.	08
	B	What is Software architecture of Embedded System Design? Explain the steps involved in designing the Embedded System.	08
Q. 5	A	Explain Memory selection criteria and interfacing aspects for Embedded application.	08
	B	Explain the implementation and testing phase in an embedded system development.	08
		OR	
Q. 6	A	Explain the productivity tool for developing embedded software systematically.	08
	B	What are reentrant functions? Give suitable example of reentrant & Non-reentrant function.	08

SECTION II

Q. 7	A	Discuss briefly different real-time scheduling policies. Furthermore, discuss different priority assignment strategies.	10
	B	Explain task states and state transition diagram.	08
		OR	
Q. 8	A	Explain shared data problem and methods to solve it.	08
	B	Explain inter process communication in RTOS. Give the implementation of any one in Embedded C.	10
Q. 9	A	Give the µcos- II RTOS features. Draw and explain the µcos II Architecture in detail.	08
	B	What is semaphore? Describe the µC/OS-II semaphore services?	08
		OR	
Q. 10	A	Explain the Resource management and give OS service functions for Time & Resource management in µcos II.	08
	B	Define the context Switching. Explain with timing diagram the steps involved in µcosII context switching?	08

Q. 11	A	Explain the digital camera as an embedded system.	08
	B	Discuss the smart cards and RF tags embedded system.	08
		OR	
Q. 12		Explain the case study and tasks involved in Embedded System application Cruise control.	16

University Of Pune
[4364]-126
B.E (Electronics Engg)
Examination - 2013
(2003 Pattern)
Process
Instrumentation(404205)

Total No. of Questions: 12 **[Total No. of Printed Pages :2]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answer any 3 question from each section.
(2) Answers to the 02 section should be written in separate answer books.
(3) Figures to the right indicate full marks.
(4)Neat diagrams must be drawn whenever necessary.
(5) Use of logarithmic tables slide rule, Mollier charts, Electronic packet calculator and steam tables is allowed.
(6) Assume suitable data, if necessary.

SECTION I

Q1. A) Draw the block diagram of closed loop control system. Explain it with suitable example. [10]
B) List and explain different Instrumentation standard signals. [8]

OR

Q2. A) Define the term transducer. With suitable example give detail classification of transducers. [10]
B) List different methods for conductivity measurement. Explain any one in detail. [8]

Q3. A) List and explain different factors for selection of control valve. [8]
B) Explain cavitation and flashing in control valve. [8]

OR

Q4. A) Draw and explain hydraulic PID controller in detail. [8]
B) Explain On-Off controller in detail. [8]

Q5. A) With suitable example and block diagram explain feedback and feed forward control system. [8]
B) Explain in detail adaptic control system and its role in process Industry. [8]

OR

Q6. A) Write a short note on statistical process control. [8]
B) Explain in detail cascade and ratio control system. [8]

SECTION II

Q7. A) Explain the mathematic model of one temperature process. [8]
B) Explain Internal Model control. [8]

Q8. A) Explain detail Model Predictive control. [8]
B) Explain gradient method for constraint handling. [8]

Q9. A) Define the term PLC. Draw and explain architecture of PLC. [8]
B) Draw the event sequence and ladder diagram for Elevator system. [8]

OR

Q10. A) Compare relay logic control and PLC. [8]
B) Define the term ladder diagram. Draw the different symbols used to construct ladder diagram. [8]

Q11. A) Draw and explain the block diagram of SCADA system. Explain it with suitable example. [10]
B) Write a short note on types of control panels. [8]

OR

Q12. A) List the different types of recorders. Explain any one with suitable application. [10]
B) Explain in detail square root extractor. [8]

[Total No. of Questions: *12*] **[Total No. of Printed Pages: *3*]**

UNIVERSITY OF PUNE

[4364]-128

T. E. (*Electronics*) Examination - 2013

Advanced Communication Engineering(2003 Course)

Elective I

[Time: *3* Hours] **[Max. Marks: 100]**

Instructions:

1. ***Answer any 3 questions from Section I and Any 3 questions from Section II***
2. *Answers to the **two sections** should be written in **separate answer-books**.*
3. *Black figures to the right indicate full marks.*
4. *Neat diagrams must be drawn wherever necessary.*
5. *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
6. *Assume suitable data, if necessary.*

SECTION –I

Q.1	A	Explain why the rectangular waveguide cannot support TEM waves?	04
	B	Define and explain following terms in rectangular waveguide. 1. Cut-off frequency 2. Dominant mode. 3. Group velocity.	06
	C	An air-filled rectangular waveguide of inside dimension 7×3.5cm operates in the dominant TE_{10} mode. 1. Find the cut-off frequency. 2. Determine the phase velocity of the wave in the guide at frequency of 3.5 GHz. 3. Determine the guide wavelength at the same frequency.	08

OR

Q.2	A	How is bunching achieved in a cavity magnetron? Explain the phase focusing effect.	06
	B	Describe the various standards for DWM.	06

	C	Draw the field patterns for ($TE_{1,0}$), ($TM_{1,0}$) & ($TE_{2,0}$) modes.	06
Q. 3	A	With the systematic and applegate diagrams, explain the principle, features and operation of two cavity klystron amplifier. State its applications.	08
	B	Describe the construction, characteristics, application and the equivalent circuit of "Gunn Diode"	08
		OR	
Q. 4	A	With the suitable sketch, describe the construction, characteristics, application of 1. Tunnel Diode 2. Varactor Diode.	08
	B	Explain with suitable diagram, how a "Magic Tee" can be used to connect the Transmitter, Receiver and Duplex Antenna.	08
Q. 5	A	Calculate: i. Maximum Unambiguous Range. ii. Duty cycle. iii. Average Transmitted Power. iv. Suitable Bandwidth in MHz. Consider that the Radar transmitter transmits a peak output power of 100kW with the p.r.f of 1000 p.p.s. and a pulse width of 1.0μ sec.	08
	B	What is meant by "Doppler Effect"? Derive the expression for relative velocity of a moving target.	08
		OR	
Q. 6	A	Calculate the maximum range of radar system which operates at 3cm, if its antenna is $5m^2$ minimum detectable signal is 10^{-13} W & radar cross sectional area is of target is $20m^2$.	08
	B	With suitable diagram explain diagram explain any three systems losses in a radar system.	08

SECTION II

Q. 7	A	Explain the Absorption and Attenuation losses in an optical fiber.	04
	B	An optical Fiber has an attenuation of 0.9 db/km at 1300nm wavelength. If the optical power launched into a 30km long optical fiber is 150μW. Find the Optical Output Power.	08

	C	Explain multimode Step-index and Graded-Index Fiber.	06
		OR	
Q. 8	A	Explain the Core and Cladding losses in an optical fiber?	04
	B	A multimode step index fiber with core diameter of 80μm and relative index difference of 1.5% is operating at wavelength of 0.85μm. If the core reactive index is 1.48, estimate. i. Normalized frequency for the fiber. ii. Number of guided modes.	08
	C	Explain with neat block schematic a digital optical fiber link.	06
Q. 9	A	What are the reason for the delays in GSM system for packet data traffic? Distinguish between circuit switched & packet oriented transmission.	08
	B	Compare TDMA, FDMA, CDMA and WCDMA mechanism.	08
		OR	
Q. 10	A	What are the main benefits of a spread spectrum system? How can be spreading be achieved?	08
	B	With neat diagram give details of cell splitting and hand off mechanism in mobile communication.	08
Q. 11	A	For c-band satellite (down link at approximately 4GHz) has a diameter of about 3m and an efficiency is of about 55%. Calculate its gain and beam width.	08
	B	Explain satellite constellation in detail with diagram.	08
		OR	
Q. 12	A	How can Kepler's law planetary motion can be applied in case of geostationary satellite? Explain.	08
	B	What is system Noise temperature? How does it affect the C/N and G/T ratio?	08

UNIVERSITY OF PUNE

[4364]-129

B. E. (Electronics) Examination - 2013

SOFTWARE ENGINEERING

(2003 Pattern)

[Time : 3 Hours] **[Max. Marks : 100]**

Total No. of Questions : 12 **[Total No. of Printed Pages :2]**

Instructions :

(1) Attempt Section I :Q1or Q2, Q3 or Q4, Q5 or Q6 and Section II: Q7 or Q8, Q9 or Q10, Q11 or Q12

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Black figures to the right indicate full marks.

(4) Neat diagrams must be drawn wherever necessary.

(5) Assume suitable data, if necessary.

SECTION I

Q1) a) What are different process framework activities ? Explain. [8]

b) Why process assessment is important? Explain different approaches used for software process assessment. [9]

OR

Q2) a) What is software process and software engineering ? Explain different layers software engineering. [9]

b) Explain incremental model with its advantages and disadvantages. [8]

Q3) a) Explain different principles of Design Modeling. [8]

b) Explain in detail testing strategy for conventional software. [8]

OR

Q4) a) Why software engineering practices are essential? [8]

b) Compare Business Process Engineering and Product Engineering. [8]

Q5) a) Explain in detail the Eliciting requirements task. [8]

b) What is DFD? Draw Level 0, Level 1, Level 2, DFD for Library Management System. [9]

OR

Q6) a) Explain the approach of Flow-Oriented modeling with proper example. [8]

b) Draw Usecase diagram for 'issue of books from college library' operation. [9]

SECTION- II

Q7) a) What principle are applicable for data design? [8]

b) Why requirement analysis is required? State three primary objective of analysis model. [8]

Q8) a) Why interface design is necessary. Explain golden rules for interface design. [8]

b) What are archetypes? Explain with suitable example. [8]

Q9) a) What factors should be considered when a structure of a software team is chosen? [8]

b) What is software metrics? What guidelines should be applied when we collect software metrics? [9]

OR

Q10) a) Explain different categories of stake holders. [8]

b) How should we use metrics during the project itself? Explain object-oriented metrics. [9]

Q11) a) Explain reverse engineering with the issues that must be addressed. [8]

b) What is software estimation? Explain LOC-based estimate method with example. [9]

Q12) a) Explain the use of decision tree analysis in make-by-decision. [8]

b) What is SCM? Explain the change control mechanism in SCM. [9]

B.E. (Electronics)

ELECTRONIC MEASUREMENT SYSTEMS

[4364-130]

(2003 Course)

Time: 3 Hours ***Max. Marks: 100***

Instructions to the candidates:

1) ***Answer any three questions from each section.***
2) ***Answer to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn whenever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Your answers will be valued as a whole.***
6) ***Use of logarithmic table, slide rule, mollier charts, electronic pocket calculator and steam tables is allowed.***
7) ***Assume suitable data, if necessary.***

SECTION- I

Q1) a) State True RMS measurement principle. [2]

b) Explain any one method of True RMS measurement. [8]

c) Explain working of Digital LCRQ meter with the help of neat block diagram. [8]

OR

Q2) a) W.r.t. Digital Multi Meter,

i) Draw schematic block diagram

ii) Explain the difference between 4 $\frac{1}{2}$ DMM and 6 $\frac{1}{2}$ DMM.

iii) Explain "Auto zero"

iv) Explain "Auto ranging" [8]

b) Explain how phase and magnitude measurement is carried out with the help of Vector Voltmeter. [10]

Q3) a) Distinguish between

i) International standards

ii) Primary standards

iii) Secondary standards

iv) Working standards [8]

b) Why calibration is required? Explain calibration standard and traceability. [8]

OR

Q4) a) In a test temperature is measured 100 times with variations in apparatus and procedures. The results are,

Temp	397	398	399	400	401	402	403	404	405
Frequency of occurrence	1	3	12	23	37	16	4	2	2

i) Calculate arithmetic mean

ii) Plot histogram of measurement [6]

b) Draw the block diagram of Universal Counter. Explain how the period is measured using Universal Counter. When the period measurement is preferred over frequency measurement? . [10]

Q5) a) Draw block diagram of DSO and explain the same. [8]

b) Write various specification and its typical values for DSO. [8]

OR

Q6) a) Explain various types of CRO probes and their specific applications. How bandwidth of CRO probe limits the bandwidth of CRO. [10]

b) What is memory depth of CRO? Explain with an example. [6]

SECTION- II

Q7) a) Draw block diagram of Spectrum Analyzer and explain the same. [8]

b) Draw block diagram of Logic Analyzer and explain the same. [8]

OR

Q8) a) Draw block diagram of FFT Analyzer and explain the same. [8]

b) Draw block diagram of Harmonic Analyzer and explain the same. [8]

Q9) Explain how following communication measurements are carried out?

i) Sensitivity

ii) Selectivity

iii) SINAD test. [18]

OR

Q10) a) How S-parameter measurement is done with the help of Network Analyzer. [10]

b) Why S parameters are used for network analysis? [4]

c) State differences between scalar and vector network analyzer. [4]

Q11) a) Write short notes on any two

i) IEEE 488

ii) PCI Express

iii) LabVIEW [16]

OR

Q12) a) Explain compute controlled test measurement with a suitable example. [8]

b) Explain virtual measurements and its applications in TDM, FDM, ASK and PSK. [8]

[Total No. of Questions:] **[Total No. of Printed Pages: 2]**

UNIVERSITY OF PUNE

[4364]-132

B. E. (*Electronics*) Examination - 2013

(Biomedical Electronics)(404211)(2003 Course)

[Time: *3* Hours] **[Max. Marks: 100]**

Instructions:

1. *Answer **Q1** or **Q2, Q3** or **Q4** and **Q5** or **Q6** from **section-I** & **Q7** or **Q8, Q9 or Q10** and **Q11** or **Q12** from **section-II.***
2. *Assume suitable data, if necessary.*
3. *Draw neat diagrams wherever necessary.*

SECTION -I

Q.1	A	Which are different types of electrodes? Explain with neat diagram, floating electrode also explain effect of movement of electrodes while recording.	9
	B	What is the problem encountered in using tradition temperature sensor-for body temperature measurement. Explain technique used to overcome this problem.	9
		OR	
Q.2	A	With the help of two electrode equivalent circuit diagram, explain measurement of bio potential. What do you mean by half cell potential.	9
	B	Explain with neat block schematic. 'Man-Instrument' system.	9
Q. 3	A	Explain with example, and calculation. How the heart rate is measured from ECG.	8
	B	Explain in brief cardio vascular system and describe about electrical signals origin in it.	8
		OR	
Q. 4	A	Explain following terms: i. Aorta and pulmonary artery ii. Ectopic beats iii. Intracellular and extra cellular fluids iv. Arrythmia	8
	B	Draw and explain input protection circuit for ECG recorder and describe its working with complete block schematic	8
Q. 5	A	What is demand pacemaker. Explain with neat diagram how it is correlated to ECG waveform	8
	B	Explain grounding and shielding techniques for medical equipments	8
		OR	

Q. 6	A	What are objectives of patient monitoring system. With neat block dig. explain bed side monitoring system.	8
	B	What is fibrillation? What causes it? Describe operation of DC defibrillator with circuit diagram and waveforms.	8

SECTION II

Q. 7	A	Describe coulter method of electronic blood cell counting.	8
	B	With block schematic explain blood gas analyser.	8

OR

Q. 8	A	What is difference between coventional and medical CRO? Explain non-fade CRO and its features.	8
	B	Explain with neat diagram spectro photo meter.	8
Q. 9	A	Explain with neat figure 10-20 system for EEG measurement	8
	B	What are functions of central nervous system. Explain in details.	8

OR

Q. 10	A	Define α, β, ϕ and δ activities associated with EEG.	8
	B	What is EMG. Explain typical set up with neat diagram.	8
Q. 11	A	Explain with neat diagram CT scanner. What are detectors used in CT Scanner.	9
	B	Explain basic principle of MRI. Explain with neat block diagram MRI machine.	9

OR

Q. 12	A	Define and explain: i. X-ray radiations ii. Gamma radiations iii. Non ionising radiations iv. Ionising radiations	8
	B	With the help of neat block schematic, describe the working of x-ray Image Intensifier	10

[Total No. of Questions: 12] **[Total No. of Printed Pages: 3]**

UNIVERSITY OF PUNE
[4364]-133
B.E. (Electronics)
(Elective-II) Examination - 2013
REAL TIME OPERATING SYSTEMS
(2003 Course)

[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

i) Answers to two sections should be written in separate answer books..

ii) In section-I attempt Q.1 or 2, Q.3 or 4 and Q.5 or 6 in section-II attempt Q.7 or 8, Q.9 or 10 and Q.11 or 12

iii) Neat diagrams, flow charts must be drawn and well commented pseudo code written wherever necessary.

iv) Figures to the right indicate full marks.

v) Assume suitable data, if necessary

SECTION-I

Q.1 a) Discuss the memory requirements in foreground/background and multi tasking system. [8]

b) Explain clock tick in multitasking system. What are the constraints in selection of the clock tick in multitasking system? How accurate time this can give? [8]

OR

Q.2 a) What is RMS theorem? How it is useful in assigning tasks priorities? Check whether the following set of periodic real-time tasks is schedulable under RMS on a uniprocessor system: T1=(e1=20, p1=100), T2=(e2=30, p2=150), T3 =(e3=60, p3=200). [8]

b) Discuss interrupt and interrupt timing for foreground/background, non-preemptive and preemptive kernel. [8]

Q.3 a) Explain, Locking and unlocking of scheduler in uCOSII, Nesting of scheduler lock, Possible situation and precautions while using scheduler lock/unlock. [8]

b) What is the use of following members of OS_TCB? And how they are manipulated? [8]

```
INT8U    OSTCBX;
INT8U    OSTCBY;
INT8U    OSTCBITX;
```

INT8U OSTCBITY;

OR

Q.4	a)	Explain, What is ready list in uCOSII? How uCOSII add the task in the ready list? How uCOSII remove a task from ready list?	[8]
	b)	What are different events handled using ECB in uCOSII. Explain data structure OS-EVENT.	[8]
Q.5	a)	write short note on any two a) Semaphore management in uCOSSII. b) Mutual exclusion semaphore in uCOSII c) Event flag management in uCOSII.	[6]
	b)	Explain in detail OSMutexCreate().	[6]
	c)	Enlist different MUTEX services. What configuration constants provided to configure MUTEX?	[6]

OR

Q.6	a)	Explain Event Flag Group data structure OS_FLAG_GRP and OS_FLAG_NODE.	[6]
	b)	Write short note on any two 1. Semaphore management in uCOSII 2. Mutual exclusion semaphore in uCOSII	[6]
	c)	What is relationship between Task, ISR and Semaphore in uCOSII?	[6]

SECTION-II

Q.7	a)	How to use Mailox as binary semaphore. Explain by using pseudo code.	[6]
	b)	What is relationship between Task, ISR and Message Queue in uCOSII.	[6]
	c)	What are message queue services in uCOSII? How Message Queue services enabled/disabled in uCOSII.	[6]

OR

Q.8	a)	Explain the relationship between tasks, ISR and message queue.	[6]
	b)	What are the features of message queue in uCOSII.	[6]
	c)	Explain Mailbox services and configuration in uCOSII.	[6]
Q.9	a)	Explain Memory Control Block data structure OS_MEM.	[6]
	b)	Explain memory partition and multiple memory partition in uCOSII.	[6]
	c)	Define porting of uCOSII. What requirements the processor should satisfy to run uCOSII?	[4]

OR

Q.10	a)	Explain the need of memory management services by OS as compare to compiler functions.	[6]

	b)	How OS_CPU.H makes uCOSII processor and implementation specific?	[4]
	c)	Explain uCOSII hardware/software architecture.	[6]
Q.11		Answer the following by considering the implementation of temperature controller.	
	a)	Define the hardware architecture for the system.	[4]
	b)	Define the tasks for the system and assign the tasks priority and explain.	[4]
	c)	Enlist the services of uCOSII required in the system.	[4]
	d)	Write the application software for the system	[4]
		OR	
Q.12		Answer the following by considering the implementation of chocolate vending machine.	
	e)	Define the hardware architecture for the system.	[4]
	f)	Define the tasks for the system and assign the task priority and explain.	[4]
	g)	Enlist the services of uCSOII required in the system.	[4]
	a)	Write the application software for the system	[4]

B.E (Electronics& Telecommunication) And Electronics

2003 Course

4364-157/136

System Programming and Operating System

May 2013

Time: 3 Hours **Max. Marks : 100**

Instructions:

1) **Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 from Section I and Solve Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12 from Section II**
2) **Answers to the two sections should be written in separate books.**
3) **Black figures to the right indicate full marks.**
4) **Neat diagrams must be drawn wherever necessary.**
5) **Assume suitable data, if necessary.**

Section I

Q.1 a) Define translator. Explain LEX & YACC tools. [8]

b) For the following 'C' statement

```
a=-b + c * -b + c
```

show the output of every phase of complier. [8]

OR

Q.2 a)Differentiate between complier and interpreter. [4]

b)What is linker?List Language processes development tools. [6]

c) What is role of Lexical analyzer? Write output of following by lexical analysis [6]

```
void main()
{
        inti,j=0;
        for(i=0;i<5;i++)
        printf("%d",&i);
}
```

Q.3 a) Explain with example different passing parameter methods for macro. [6]

b) Differentiate between macro & function. [4]

c) Draw flow chart of Pass I of assembler. [6]

OR

Q.4 a) What is assembler?Write algorithm for Pass II of Assembler. [8]

b) What is forward reference?How table of incomplete information is used for forward reference handling? [8]

Q.5 a) What is relocation? How relocation is handled in direct linking loader? [6]

b) Explain design of absolute loader. [6]

c) What is dynamic loading?How utilization of memory is done in dynamic loading? [6]

OR

Q.6 a) Explain basic function of loader. [4]

b) Explain BSS loader. [6]

c) Give ESD, RLD cards for both PGA & PGB. Also give the contents of GEST [8]

```
Relative Address        Source Program
0          PGA   START
                 ENTRY PG1ENT1, PG1ENT2
                 EXTERN PG2ENT1, PG2
20      PGAENT1
30      PGAENT2
40                DC    A(PGAENT2)
44                DC    A(PGAENT1 + 15)
48                DC    A(PGAENT2- PG1ENT1-3)
52                DC    A(PGB)
56                DC    A(PGBENT1+PGB- PGAENT1+4)
        END
0          PGB   START
                       ENTRY PGBENT1
                       EXTERN PGAENT1, PGAENT2
16      PGBENT1
24                DC    A(PGAENT2)
28                DC    A(PGAENT1)
32                DC    A(PGBENT2- PGBENT1-3)
        END
```

Section II

Q.7 a) What is the meaning of the term busy waiting? What other kinds of waiting are there in an operating system? Can busy waiting be avoided altogether? [8]

b) Draw and explain the process state transition diagram. Explain the structure of PCB. [8]

OR

Q.8 a)Explain how deadlock detection and prevention is done ? [8]

b) State and explain different operating system services in detail. [8]

Q.9) a) Explain the following terms: [6]

i) Compaction
ii) Thrashing

b) Compare and explain paging and segmentation. [6]

c) Differentiate the contiguous and non-contiguous memory allocation. [6]

OR

Q.10 a) Write a short note on virtual memory management. [6]

b) Explain the paging hardware with TLB with the help of suitable diagram. [6]

c) Explain key features of windows file system. [6]

Q.11 a) Explain mechanism and policies in file system and IOCS layers. Explain steps involved in I/O Operations. [8]

b) Based on what criterion I/O devices are classified? How I/O time of record is calculated? Explain Magnetic Tape and Magnetic Disk in short. [8]

OR

Q.12 a) What is device driver? Explain device driver for USB and parallel port. [6]

b) Write short note on Advanced I/O Programming [6]

c) Differentiate between serial port and parallel port. [4]

[Total No. of Questions: 12] **[Total No. of Printed Pages: 3]**

UNIVERSITY OF PUNE
[4364]-137
B. E. (Electronics) Examination - 2013
DIGITAL IMAGE PROCESSING(Elective II)
(2003 Course)

[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

1 *Answers to the two sections should be written in separate answer-books.*
2 *Neat diagrams must be drawn wherever necessary.*
3 *Figures to the right indicate full marks.*
4 *Assume suitable data, if necessary.*

SECTION -I

Q.1	A	Draw the block diagram of typical image processing system and explain function of each block.	8
	B	Explain the basic relationship between the pixels.	8

OR

Q.2	A	What do you understand by simple image model? Explain the effect of sampling and quantization levels in the quality of digital image.	8
	B	Draw and explain gray level human vision model.	8
Q. 3	A	Explain the need of color models. Compare YIQ and HIS color models.	8
	B	Explain DCT in detail stating its application in the field of image processing. Also state how Walsh Hadamard transform is different from DCT.	8

OR

Q. 4	A	Explain 2-D Fourier Transform and its following properties i) Translation ii) Scaling iii) Convolution	8
	B	Discuss the following properties of image transforms i) Energy compaction ii) Decorrelation	8

iii) Symmetry
iv) Separabilty

Q. 5 A What is the difference between histogram equalization and histogram matching? Explain histogram matching in detail. 10

B Explain in short following image enhancement technique and mention its application. 8

i) Intensity level slicing
ii) Negative of an image
iii) Power law transformation
iv) Contrast stretching

OR

Q. 6 A Explain the different techniques for sharpening of an image in Spatial domain 8

B Explain median filtering? Give its applications. Compare median filtering with averaging filter with an example 10

SECTION II

Q. 7 A Image matrix for 4 bit/pixel image is given as follows: 8

$$\begin{bmatrix} 15 & 15 & 10 & 8 \\ 15 & 10 & 8 & 8 \\ 15 & 10 & 8 & 8 \\ 10 & 8 & 8 & 8 \end{bmatrix}$$

Find:

i) Huffman code for gray levels in the image
ii) Average length of code words
iii) Efficiency

B Explain lossy predictive coding technique for image compression. 8

OR

Q. 8 A Explain image compression using JPEG. 8

B What are the various data redundancies identified in an image? Explain 8

Q. 9 A Compare the performance of first and second order derivative with respect to an image? Which one would you prefer for detecting edges? Why? 8

B What is boundary representation? Explain how chain codes are used for boundary representation. 8

OR

Q. 10	A	What is Hough transform? How it is used for edge linking?	8
	B	What is a skeleton of an image? Explain the algorithm to obtain skeleton of an object in a digital image.	8
Q. 11	A	Explain with block diagram all the steps of fingerprint recognition. State the assumptions made.	10
	B	Draw and explain the model of image degradation and restoration. Discuss the various methods of estimating the degradation function.	8

OR

Q. 12	A	Explain the difference between image enhancement and restoration? List and in short explain the various algorithms used for the processing in case of restoration.	10
	B	Explain with block diagram all the steps of character recognition.	8